

Trend Study 21-2-03

Study site name: Lovell Hollow.

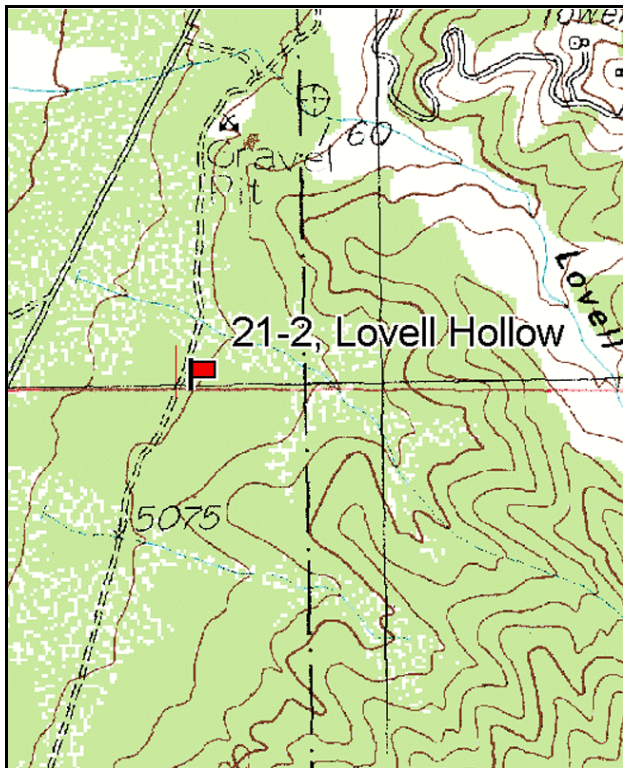
Vegetation type: Chained, seeded P-J.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

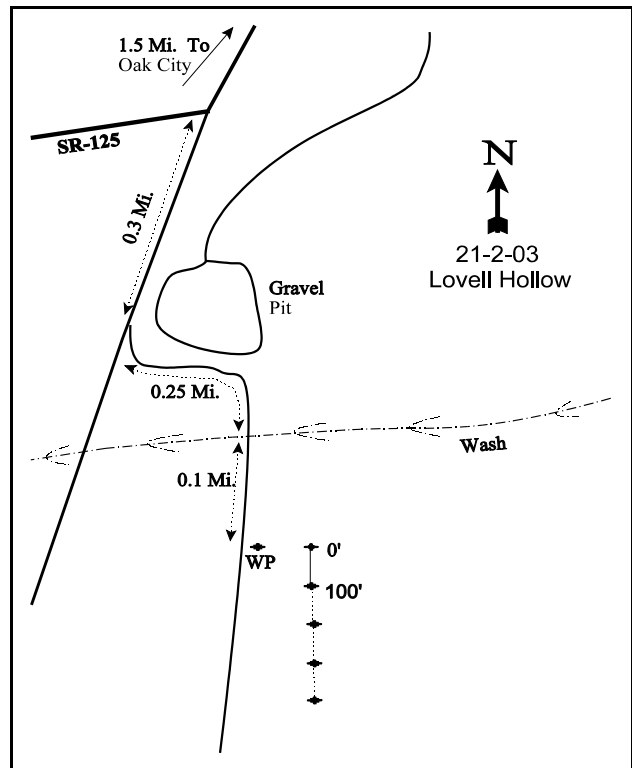
LOCATION DESCRIPTION

From the southern limit of Oak City, proceed 1.5 miles southwest on SR 125. Turn left on an improved road and go 0.3 miles. Turn left, then turn right at the south end of the gravel pit. Proceed 0.25 miles to a fork in the bottom of a wash. Continue south 0.1 miles (550 feet) to a full high green fencepost 5 feet off the left side of the road. The baseline starts 100 feet east of the witness post. The 0' stake is a green fencepost marked by browse tag #7115.



Map Name: Oak City South

Township 17S, Range 5W, Section 12



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4355987 N, 382595 E

DISCUSSION

Lovell Hollow - Trend Study No. 21-2

This study samples severe winter range on the juniper-big sagebrush foothills of the Canyon Mountains. Located at the base of the hills, this study slopes at 7-10% to the west at an elevation of 5,200 feet. The site was burned in 1981, when wildfires consumed several thousand acres of winter range to the east. Another fire burned this area prior to the 1991 reading which eliminated all of the sagebrush on the site. The site was seeded after the fire with crested wheatgrass, intermediate wheatgrass, smooth brome, and fourwing saltbush. Pellet group transect data indicate light deer use in 1998 and 2003 at 8 deer days use/acre (20 ddu/ha) and 7 deer days use/acre (17 ddu/ha) respectively. Cattle use on the site was high at 30 cow days use/acre (74 cdu/ha) in 1998 but low at only 7 days use/acre (17 cdu/ha) in 2003.

The soil is very deep and well-drained with no rocks in the profile. Effective rooting depth was estimated at almost 31 inches in 1998. Soil texture is a loamy sand, and soil reactivity is neutral (pH of 7.2). Organic matter is very limited at less than 1%. Phosphorus may also be limiting at 2.2 ppm as 10 ppm are thought necessary for normal plant growth and development. In 1998, the soil profile appeared dry on the surface down to a depth of 8 to 10 inches, but then moist beyond 10 inches. There may be a clay horizon lower down which helps hold moisture in the soil. Average soil temperature was measured at 76°F in August of 1998 and 58.2°F in May of 2003. Both temperatures were measured at a depth of 18 inches. The difference in soil temperature between years is primarily due to the time of sampling and soil moisture. Soil moisture would be much higher in May compared to August on a low elevation site such as Lovell Hollow that has deep, well-drained soils. Although percent bare ground averages about 43% on the site, the potential for water erosion on this site is slight with moderately rapid permeability, slow runoff, and the gentle terrain. Most soil movement appears to be by the wind, with some soil pedestalling occurring around shrubs and bunchgrasses. An erosion condition class assessment documented very little evidence of erosion on the site in 2003.

Prior to wildfire, the browse component on this site consisted mainly of basin big sagebrush with scattered bitterbrush. Following the wildfire, both sagebrush and bitterbrush were effectively eliminated from the site. The area was apparently chained and seeded following the burn with crested, and intermediate wheatgrasses, smooth brome, and fourwing saltbush. The only important browse species to be sampled in the density strips in 1998 and 2003 was fourwing saltbush. However, density was estimated at only 20 plants/acre on both sampling dates. Fourwing saltbush plants were heavily hedged in 2003, but remain healthy and vigorous. Mature fourwing plants averaged just over 4 feet in height in 1998 and 2003. Neither basin big sagebrush or bitterbrush have been sampled in the density strips since the site burned, but a few individuals of both species are scattered around the site. Annual leader growth averaged 2.7 inches on fourwing saltbush and 1.4 inches on bitterbrush in 2003. Two increasers, stickleaf low rabbitbrush and broom snakeweed, had increased densities in 2003, but both species still occur in low numbers. Some of the rubber rabbitbrush encountered in 1998 were totally stripped of leaves, apparently due to crickets or grasshoppers. Although there were no crickets on site during the reading on 8/25/98, there were signs of crickets on other sites in the unit in 1998. No crickets were seen on site in 2003.

The herbaceous understory is moderately abundant but dominated by annual species. In 1998, cheatgrass and Russian thistle made up 77% of the herbaceous ground cover. Cheatgrass and most other annual species were not included in the previous sampling dates (1985 and 1991), but photos showed abundant cheatgrass and other annual weeds on the site in 1991. In 2003, cheatgrass declined in nested frequency but still remains the most abundant herbaceous species on the site. Seeded grasses are sparsely scattered throughout the site, including crested and intermediate wheatgrass, and smooth brome. Two native species, western wheatgrass and Indian ricegrass, have the highest nested frequency values of all the perennial grasses. Western wheatgrass significantly increased in 2003 whereas Indian ricegrass remained stable. The forb component is

insignificant on this site.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable to possibly improving. The continued development of cryptogamic soil is very desirable, but it is fragile and care should be taken to avoid off-road vehicle use and trampling by livestock and firewood gatherers. The lack of desirable herbaceous species combined with inadequate reproduction in sagebrush, the key species, indicates a slow downward trend for the vegetation component. However, the bitterbrush may be slowly increasing, and if weather conditions favor sagebrush seedling establishment in the near future, the trend may be reversed.

1991 TREND ASSESSMENT

Basal vegetation cover is very low at only 2%, but shows improvement since 1985 due to the increase in grasses and forbs. Litter cover has also increased due to the increase in herbaceous vegetation, but percent bare ground has slightly increased. Soil trend is stable. Due to the fire, there are no key browse species, so trend for browse is down. Herbaceous trend has improved with the seeding of desirable grasses, although the site is still dominated by cheatgrass and weedy forbs.

TREND ASSESSMENT

soil - stable (3)

browse - down due to fire (1)

herbaceous understory - slightly up (4)

1998 TREND ASSESSMENT

Trend for soil is stable. Litter cover has declined partly due to the decomposition of churning debris. However, percent bare soil has declined slightly from 45% to 42%. Water erosion is minimal due to the sandy nature of the soil, yet some wind erosion does occur. The browse trend is up slightly due to the appearance of some seeded fourwing saltbush. These plants occur in low densities but they are large, vigorous, and producing abundant seed. Small numbers of coin buckwheat were also encountered this year. Trend for the herbaceous understory is up slightly for perennial grasses but down for forbs. Cheatgrass still dominates the site by producing 79% of the grass cover. Forb composition is dominated by Russian thistle which grows in dense patches. Overall, trend for the herbaceous understory is stable.

TREND ASSESSMENT

soil - stable (3)

browse - up slightly (4)

herbaceous understory - stable (3), but still dominated by cheatgrass and other annuals

2003 TREND ASSESSMENT

Trend for soil is stable. With drier conditions preceding the 2003 reading, vegetation and litter cover have slightly declined, and percent bare soil has slightly increased since 1998. However, trend is stable with a slight increase in cryptogamic cover and nested frequency for perennial grasses which are important at holding soils in place. There was little evidence of erosion. Trend for browse is stable, but limited due to continued low abundance of preferred species. Fourwing saltbush is the key species, but is present at only 20 plants/acre. Fourwing plants are heavily utilized, but show normal vigor. Basin big sagebrush and bitterbrush, the key species prior to the burn, are scattered throughout the site but were not sampled in the transect. The herbaceous understory trend is stable. Cheatgrass remains the dominant herbaceous species,

even with a slight decrease in nested frequency in 2003. Perennial grasses increased in sum of nested frequency, with two natives, Indian ricegrass and western wheatgrass being the most abundant. Forbs remain insignificant on the site.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 21 , Study no: 2

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	a-	b ¹⁴	ab ¹	b ¹²	.03	.89
G	Agropyron intermedium	a-	b ¹⁷	bc ¹⁷	c ³⁸	.99	2.26
G	Agropyron smithii	a-	b ¹⁸	b ²⁶	c ⁷⁸	.36	.96
G	Agropyron spicatum	3	-	4	-	.00	-
G	Bromus inermis	-	2	-	4	-	.18
G	Bromus tectorum (a)	-	-	b ³⁶⁵	a ³³⁷	18.14	24.34
G	Oryzopsis hymenoides	a ³	a ⁹	b ⁵²	b ⁴³	3.13	1.37
G	Stipa comata	-	-	7	5	.30	.30
G	Vulpia octoflora (a)	-	-	-	5	-	.03
Total for Annual Grasses		0	0	365	342	18.14	24.38
Total for Perennial Grasses		6	60	107	180	4.83	5.98
Total for Grasses		6	60	472	522	22.97	30.36
F	Arabis spp.	-	-	3	-	.00	-
F	Comandra pallida	-	-	-	3	-	.00
F	Epilobium brachycarpum (a)	-	-	-	1	-	.00
F	Eriogonum cernuum (a)	19	-	-	-	-	-
F	Gilia spp. (a)	-	-	a-	b ⁷⁰	-	.23
F	Lactuca serriola	-	1	7	-	.04	-
F	Lygodesmia grandiflora	-	1	-	5	-	.01
F	Machaeranthera canescens	b ¹⁹	c ¹⁸⁹	a-	ab ⁷	-	.02
F	Oenothera pallida	a-	a-	c ⁷¹	b ¹⁴	.93	.21
F	Phlox longifolia	a-	b ³⁶	a-	a ³	-	.00
F	Salsola iberica (a)	-	-	b ³²	a-	2.26	-
F	Sisymbrium altissimum (a)	-	-	3	9	.01	.19
F	Sphaeralcea grossulariaefolia	-	-	-	3	-	.00
F	Stephanomeria exigua (a)	a-	b ¹⁴	a-	a-	-	-
F	Unknown forb-perennial	-	-	5	4	.18	.03

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
	Total for Annual Forbs	19	14	35	80	2.28	0.43
	Total for Perennial Forbs	19	227	86	39	1.15	0.30
	Total for Forbs	38	241	121	119	3.44	0.73

Values with different subscript letters are significantly different at $\alpha = 0.10$

BROWSE TRENDS --

Management unit 21 , Study no: 2

T y p e	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Atriplex canescens	1	1	2.24	.56
B	Chrysothamnus viscidiflorus viscidiflorus	4	6	.41	1.68
B	Eriogonum nummularre	1	0	-	-
B	Gutierrezia sarothrae	0	2	-	.15
	Total for Browse	6	9	2.65	2.40

CANOPY COVER, LINE INTERCEPT --

Management unit 21 , Study no: 2

Species	Percent Cover
	'03
Atriplex canescens	.05
Atriplex confertifolia	.68
Chrysothamnus viscidiflorus viscidiflorus	2.08

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 21 , Study no: 2

Species	Average leader growth (in)
	'03
Atriplex canescens	2.7
Purshia tridentata	1.4

BASIC COVER --

Management unit 21 , Study no: 2

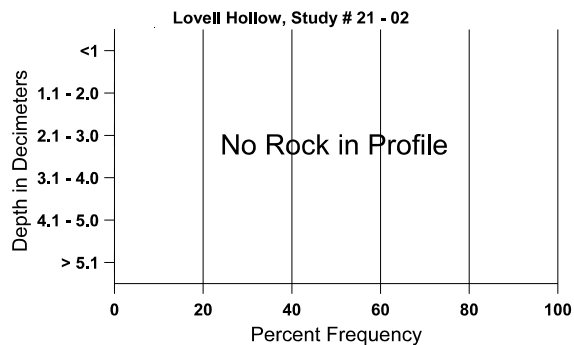
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	.50	2.00	33.58	32.51
Rock	0	0	0	0
Pavement	.50	.25	.44	.20
Litter	48.50	52.50	38.68	32.02
Cryptogams	9.25	0	.79	1.92
Bare Ground	41.25	45.25	41.95	45.95

SOIL ANALYSIS DATA --

Management unit 21, Study no: 2, Study Name: Lovell Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	ds/m
30.9	58.2 (18.1)	7.2	85.3	6.4	8.3	0.6	2.2	137.6	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 21 , Study no: 2

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	12	18	-	-
Deer	11	-	8 (20)	3 (7)
Cattle	10	9	30 (74)	3 (7)
Antelope	2	-	-	-

BROWSE CHARACTERISTICS --

Management unit 21 , Study no: 2

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata tridentata</i>											
85	1465	-	66	866	533	-	0	0	36	14	33/32
91	0	-	-	-	-	-	0	0	0	0	-/-
98	0	-	-	-	-	600	0	0	0	0	-/-
03	0	-	-	-	-	-	0	0	0	0	42/91
<i>Atriplex canescens</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	20	-	-	20	-	-	0	0	-	0	51/76
03	20	-	-	20	-	-	0	100	-	0	54/78
<i>Atriplex confertifolia</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	40/79
<i>Chrysothamnus nauseosus</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	21/54
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>											
85	0	-	-	-	-	-	0	0	0	0	-/-
91	0	-	-	-	-	-	0	0	0	0	-/-
98	80	-	-	40	40	-	0	50	50	25	25/40
03	140	-	-	140	-	40	0	0	0	0	24/41
<i>Eriogonum nummularae</i>											
85	865	-	266	533	66	-	0	0	8	8	13/15
91	0	-	-	-	-	-	0	0	0	0	-/-
98	20	-	-	-	20	-	0	0	100	100	-/-
03	0	-	-	-	-	-	0	0	0	0	-/-

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Gutierrezia sarothrae</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	11/19
03	40	-	-	40	-	-	0	0	-	0	8/18
<i>Juniperus osteosperma</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	20	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Purshia tridentata</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	29/103
<i>Tetradymia canescens</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	25/46